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File ref.: **PCT/EP2005/003893**

Applicant: **PROFIL-Verbindungstechnik GmbH & Co. KG**

We have enclosed a request for an international preliminary examination of the above application together with replacement pages 38, 41, 42 and 43 on which the independent claims 26, 39 and 43 contain clarifications. We furthermore enclose a further copy of the corresponding pages from which the amendments can be seen.

At the same time, we would like to comment on the written communication of the International Search Authority as follows:

In the written communication, the examiner first refers to D1 (US-A-3,775,791) and states that this document discloses a method in accordance with the preamble of

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claim 1 and furthermore that the subject matter of claim 1 differs from the known method by features a), b) and c). This statement is correct in our opinion.

It is furthermore criticized that these features are already used for the same purpose in a similar method with reference to citation D2 (EP-A-0 663 247), from which the examiner draws the conclusion that it would be obvious to use these features in a method in accordance with D1 to arrive at the claimed method. We feel that this opinion is not correct, and indeed for the following reasons:

The method in accordance with D1 and the method in accordance with D2 are basically different types of method. The method in accordance with D1, also like the method in accordance with the invention, is carried out in a progressive tool, with a profile bar being processed on each stroke of a press in which the progressive tool is installed in a plurality of stations which carry out respective operations. For this purpose, the profile bar runs through the progressive tool in steps and the individual tools have to be fully opened for each stroke of the press so that the profile bar can be advanced in steps. The profile bar has to be supported substantially at all sides so that, on the carrying out of the required pressing steps, the material of the profile bar does not expand in an undefined manner. A particular problem in the use of such progressive tools is that, if more than three working stations are arranged sequentially, an unwanted elongation of the profile bar occurs which leads to an incorrect formation of the individual nut elements. In this connection, a cutting station is not considered as a critical working station since no elongation of the profile bar is caused there.

D2, in contrast, deals with the manufacture of individual elements from individual blanks (see column 3, lines 43-46). The precise shape of the blanks is not set forth in D2, but the quoted text passage makes clear that some shaping steps have already taken place beforehand.

Special shaping steps are then carried out on the respective blanks in individual die buttons separate from one another and of different designs (Fig. 1, Fig. 2, and Fig. 3) before subsequently a thread is cut into the individual elements to produce the finished nut elements in accordance with Fig. 4 and Fig. 5 respectively.

Such manufacturing processes, which are considered drop-forge processes, are well known per se. However, they are disadvantageous in comparison with processes which can be carried out with a progressive tool since they work substantially more slowly, which increases the production costs of the individual elements.

The closed peripheral rim (14 in Fig. 4 of D 2), which has a rectangular shape here, is typical for such elements manufactured in a drop-forge process. The rectangular shape is important because the required resistance to rotation is produced in this manner. It will be understood that, if the element is attached to a sheet metal part, as shown in Fig. 5 of D2, the flat sides of the peripheral rim 14 prevent the nut element from being able to rotate with respect to the sheet metal part.

In D2, neither the precise shape of the blanks used nor the precise shape of the hollow space of the die buttons used are set forth. It can only be assumed that, for example, the hollow spaces of the die buttons have an outer shape in cross-section which corresponds to that of the nut element of Fig. 4. If this were not the case, it would not be possible

to achieve the precise shape of the nut element of Fig. 4 since the material could expand in an unwanted manner during drop-forging so that the desired shape is not achieved.

However, this shape is not suitable for manufacture in a progressive tool so that, in our opinion, it would by no means be obvious to combine D1 and D2.

Even if this were to be done, the following would be found:

D1 does not deal with the processing of a profile bar having a rectangular cross-section, but the cross-sectional shape of the profile bar used there can rather be seen from Fig. 2A; it corresponds to a hat-like cross-sectional shape. The element manufactured by means of the method of the invention has no peripheral rim 14 of a polygonal design, but is designed, as Fig. 6E shows, only as a conical recess – circular in a plan view – in the corresponding lower face of the nut element. No security against rotation can therefore be achieved via a polygonal shape of the recess here. Instead, ribs for a security against rotation such as 272 in Fig. 6E or in Fig. 8D have to be provided.

Finally, the nut elements in accordance with the invention also lack a ring wall which stands, so-to-say, perpendicular to the lower face of the element, but which forms an essential constituent of the element of D2.

It must also be noted that, when the preparatory steps for the manufacture of the blank – whatever these may be – are taken into account as the starting point for Fig. 1A of D2, the method in accordance with D2 would have to work with at least four different shaping steps; in addition, if one were to try to realize the method of D2 in a progressive tool

with a profile bar – which is, however, not obvious in our opinion – the problem of the elongation of the profile bar would form a serious obstacle.

We are therefore of the opinion that claim 1 does not result in an obvious manner from a combination of D1 and D2, that an attempted combination of the teaching of the two references will not lead to the subject matter of the application and that the combination could anyway only be proposed on the basis of a retrospective manner of observation with knowledge of the teaching of the present invention, which is, however, not lawful.

If, however, as we believe, claim 1 is capable of protection, this must also apply to dependent claims 2 – 25.

It was claimed with respect to independent claim 26 that citation D3 (US 2004/0042870 A1, FabriSteel) discloses all the claimed features. We assume that the reference to D1 in the final sentence of paragraph 3 of the written communication is incorrect and that D3 is meant.

It must first be noted with respect to the element of D3 that this element is also not suitable to be manufactured in a progressive tool, but that such nut elements are rather manufactured individually in drop-forge tools.

The FabriSteel element is a round element having a ring-like undercut outer wall. Not only can such an element not be manufactured by a progressive tool, but the under cut outer wall is also made straight on all four sides. In the present invention, such a shape is avoided by use

of a section rectangular in cross-section as the starting part for the manufacture of the element.

To make clear that the square or rectangular outline of the element is an essential part of the present invention, we enclose a new version of claim 26 in the form of replacement page 38 in which the word "in particular" in line 2 has been removed. We have furthermore defined the ring recess 112 somewhat more precisely in the sense that it is here a conically shaped ring recess. We believe that a sufficient distance to the nut element of the citation has been established with these amendments.

The present invention also contains independent claim 39 which deals with a special variant of the element of the invention in accordance with Fig. 12D. Here, instead of a conical ring recess in the second broad side 3 of the nut element, an embodiment having diverging surfaces is used which diverge away from the first broad side in the direction of the piercing section, viewed from the central longitudinal axis of the element. This represents a substantial difference to the element of D2 since there the side walls of the peripheral rim 14 are either parallel to the longitudinal axis of the element or are inclined inwardly. The special shape in accordance with claim 39 permits the manufacture of such an element in a progressive tool from a profile bar having a rectangular cross-section. To emphasize the obliquely set surfaces and to make clear that these are diverging surfaces and not converging surfaces, claim 39 has been supplemented accordingly at the end of the characterizing portion.

If, as we believe, the elements in accordance with claims 26 and 39 are inventive, the combination with a component assembly in accordance with claim 40 must likewise be considered inventive.

The examiner quoted D1 with respect to independent claim 43. The analysis of D1 made by the examiner is, however, not correct in our opinion, and indeed for a number of reasons.

It is first required in the characterizing portion of claim 43 that an upsetting process is carried out in a first working station A. However, in D1, a piercing process is carried out in the first station.

In claim 43, a piercing process should take place in the second working station, and indeed for the manufacture of the slits 42 which separate the individual element bodies from one another. It is therefore a different piercing process. To make this clear, it is emphasized in the revised version of claim 43 that the piercing process takes place using a cylindrical piercing punch.

In claim 43, a flattening process is carried out in the third working station C which is intended to flatten the free end face of the cylindrical pierced section. In D1, in contrast, it is hardy possible to speak of a flattening process. Only the outwardly arched sides of the nut body are removed. It is in any case a different flattening process than the one claimed, which was expressed by a minor rewording in the characterizing portion of claim 43.

The characterizing portion of claim 43 furthermore requires the separation of in each case two hollow body elements from the section or from each section to be carried out in a fourth working station by means of

the cut-off punch. There is no cut-off punch in D1. The nut elements are wound around to form a coil 54 here; the separation at the position 55 "CUTOFF" only refers to a cutting through of the wound sequence of nuts from the following sequence of nut elements.

It is furthermore clearly expressed in claim 43 that in each case two operations are carried out for each stroke of the progressive tool, i.e. exactly two operations for each stroke of the progressive tool. This is also necessary when, as provided for in accordance with the invention, in each case two nut elements are cut off on each stroke of the press.

In D1, in contrast, three working steps are carried out for each stroke of the press, which would only make sense per se if it were possible to cut off three nut elements for each stroke of the press. This problem naturally does not occur with D1 since the sequence of nut elements is wound up.

The carrying out of three operations for each stroke of the press is, however, also disadvantageous in that here in turn an unwanted elongation of the profile bar will occur which can result in incorrect formations of the nut elements.

The applicant is therefore of the opinion that the independent claims of the present application differ at least in the version revised here from the prior art in a patentable manner and that it will now be possible to issue a positive preliminary international examination report. If this should not be the case, the undersigned would like to have the opportunity to discuss this application with the responsible examiner since the applicant considers it important to obtain a positive preliminary international examination report. A discussion could also take place at

short notice on the part of the undersigned since his office is only around 100 m away from the Pschorrhof building of the EPO. If the examiner should consider such a personal discussion sensible, he is respectfully requested to contact the undersigned by telephone.

For the applicant
Manitz, Finsterwald & Partner

James G. Morgan

Enclosure:
Amended pages 38, 41, 42 and 43 of the claims
Copies of the corresponding pages from which the amendments made can be seen

drical projection (210), with the recess (212') being provided with a ring surface or surfaces set obliquely to the central longitudinal axis of the hollow body element and, in the second step b), the material between the first broad side (2) of the section (1) and the base (216) of the hollow cylindrical projection (210) is pierced or punched out for the formation of a through-going aperture (204).

26. Hollow body element for attachment to a component (280) normally consisting of sheet metal having an ~~in particular~~ at least substantially square or rectangular outline with a first broad side (2) and a second broad side (3) forming a sheet metal contact surface, with a piercing section (222) which projects beyond the second broad side (3) and has an undercut (244) and is surrounded by a ring recess (212) having a conical outer surface in the second broad side, with the conical outer surface merging into the second broad side -and also with an aperture (204) which extends from the first broad side (2) through the piercing section (222), with the aperture optionally having a thread cylinder (206),
characterized in that
features (272) providing security against rotation are formed outwardly at the hollow cylindrical projection (210) and/or inwardly in the region of the ring recess (212) around the hollow cylindrical projection (210).

27. Hollow body element in accordance with claim 26,
characterized in that
the features providing security against rotation are formed by ribs (272) and/or grooves at the radially outer side of the hollow cylindrical projection (210).

the opening of the hollow cylindrical projection (210) is provided at its free end with a rounded or chamfered run-out edge (234).

37. Hollow body element in accordance with one of the preceding claims 26 to 36,
characterized in that
the ring recess (212) is provided with a ring-like base region (238) which stands at least approximately in a plane parallel to the first and second broad side (2, 3), and merges at the radially inner side with an at least substantially rounded transition (240) into the outer side of the hollow cylindrical projection and at the radially outer side into a conical surface (242).

38. Hollow body element in accordance with one of the preceding claims 26 to 37,
characterized in that
the ring recess (212) is executed with an external diameter which is only somewhat smaller than the smallest transverse dimension of the hollow body element (200) which is rectangular in plan view, whereby the ring recess forms webs with the second broad side of the section which remain at the narrowest points in the plane of the second broad side in the range from 0.25 to 1 mm, preferably of approximately 0.5 mm.

39. Hollow body element for attachment to a component (280) normally consisting of sheet metal having an in particular at least substantially square or rectangular outline with a first broad side (2) and a second broad side (3) with a piercing section (222) which projects beyond the second broad side (3) and has an undercut (244) and is surrounded by a ring recess (212') in the second broad side and also with an aperture (204) which extends from the first broad side (2) through the piercing section (222), with the aperture optionally having a thread cylinder (206),
characterized in that

the ring recess (212') is polygonal and in particular square in plan view and in that the ring recess (212') is provided with a ~~surface or~~ plurality of surfaces set obliquely to the central longitudinal axis of the hollow body element which are inclined away from the central longitudinal axis of the hollow body element, when viewed in the direction from the first broad side to the second broad side.~~,~~

40. Component assembly comprising a hollow body element (200) in accordance with one of the preceding claims 26 to 39, which is attached to a component, for example to a sheet metal part (280), with the material of the component or of the sheet metal part (280) contacting the surface of the ring recess (212) of the hollow body element at the surface of features (272) providing security against rotation and also at the surface of the undercut (244) of the piercing section (222) of the hollow body element, and with a ring recess (282) being present in the material of the component or of the sheet metal part (280) around the piercing section.

41. Component assembly in accordance with claim 40,
characterized in that
the axial depth of the ring groove (282) in the sheet metal part is selected in dependence on the length of the piercing section and the thickness of the sheet metal part (280) so that the end face (224) of the piercing section (222) does not project or only fractionally projects beyond the side of the sheet metal part which is remote from the body of the hollow body element (200) and is present in the region beneath the second broad side (3) of the hollow body element around the ring recess (212) of the hollow body element.

42. Component assembly in accordance with claim 40 or 41,
characterized in that
the second broad side (3) of the hollow body element (200) is at least substantially not pressed into the sheet metal material or is at most only trivi-

ally pressed into the sheet metal material in the region around the ring recess (212) of the hollow body element (200).

43. Progressive tool for the manufacture of hollow body elements (200) such as nut elements for attachment to components normally consisting of sheet metal (280), in particular for the manufacture of hollow body elements having an at least substantially square or rectangular outline (202) by cutting individual elements to length from a section (1) present in the form of a profile bar or a coil after prior piercing of apertures (204) into the section, optionally with subsequent formation of a thread cylinder (206) using a progressive tool with a plurality of working stations (A, B, C, D) wherein in each case two operations are simultaneously carried out for each stroke of the progressive tool in each working station for the section or for a plurality of sections arranged alongside one another, characterized in that

an upsetting process is carried out in a first working station (A) for the manufacture of a cylindrical projection at the second broad side, a piercing process is carried out in a second working station (B) by means of a cylindrical piercing punch, a flattening process is carried out in a third working station (C) for the manufacture of an undercut of the cylindrical projection and the separation of in each case two hollow body elements from the section or from each section is carried out in a fourth working station (D) by means of the cut-off punch.

drical projection (210), with the recess (212') being provided with a ring surface or surfaces set obliquely to the central longitudinal axis of the hollow body element and, in the second step b), the material between the first broad side (2) of the section (1) and the base (216) of the hollow cylindrical projection (210) is pierced or punched out for the formation of a through-going aperture (204).

26. Hollow body element for attachment to a component (280) normally consisting of sheet metal having an at least substantially square or rectangular outline with a first broad side (2) and a second broad side (3) forming a sheet metal contact surface, with a piercing section (222) which projects beyond the second broad side (3) and has an undercut (244) and is surrounded by a ring recess (212) having a conical outer surface in the second broad side, with the conical outer surface merging into the second broad side and also with an aperture (204) which extends from the first broad side (2) through the piercing section (222), with the aperture optionally having a thread cylinder (206),
characterized in that
features (272) providing security against rotation are formed outwardly at the hollow cylindrical projection (210) and/or inwardly in the region of the ring recess (212) around the hollow cylindrical projection (210).

27. Hollow body element in accordance with claim 26,
characterized in that
the features providing security against rotation are formed by ribs (272) and/or grooves at the radially outer side of the hollow cylindrical projection (210).

the opening of the hollow cylindrical projection (210) is provided at its free end with a rounded or chamfered run-out edge (234).

37. Hollow body element in accordance with one of the preceding claims 26 to 36,
characterized in that
the ring recess (212) is provided with a ring-like base region (238) which stands at least approximately in a plane parallel to the first and second broad side (2, 3), and merges at the radially inner side with an at least substantially rounded transition (240) into the outer side of the hollow cylindrical projection and at the radially outer side into a conical surface (242).

38. Hollow body element in accordance with one of the preceding claims 26 to 37,
characterized in that
the ring recess (212) is executed with an external diameter which is only somewhat smaller than the smallest transverse dimension of the hollow body element (200) which is rectangular in plan view, whereby the ring recess forms webs with the second broad side of the section which remain at the narrowest points in the plane of the second broad side in the range from 0.25 to 1 mm, preferably of approximately 0.5 mm.

39. Hollow body element for attachment to a component (280) normally consisting of sheet metal having an in particular at least substantially square or rectangular outline with a first broad side (2) and a second broad side (3) with a piercing section (222) which projects beyond the second broad side (3) and has an undercut (244) and is surrounded by a ring recess (212') in the second broad side and also with an aperture (204) which extends from the first broad side (2) through the piercing section (222), with the aperture optionally having a thread cylinder (206),
characterized in that

the ring recess (212') is polygonal and in particular square in plan view and in that the ring recess (212') is provided with a plurality of surfaces set obliquely to the central longitudinal axis of the hollow body element which are inclined away from the central longitudinal axis of the hollow body element, when viewed in the direction from the first broad side to the second broad side.

40. Component assembly comprising a hollow body element (200) in accordance with one of the preceding claims 26 to 39, which is attached to a component, for example to a sheet metal part (280), with the material of the component or of the sheet metal part (280) contacting the surface of the ring recess (212) of the hollow body element at the surface of features (272) providing security against rotation and also at the surface of the undercut (244) of the piercing section (222) of the hollow body element, and with a ring recess (282) being present in the material of the component or of the sheet metal part (280) around the piercing section.

41. Component assembly in accordance with claim 40,
characterized in that
the axial depth of the ring groove (282) in the sheet metal part is selected in dependence on the length of the piercing section and the thickness of the sheet metal part (280) so that the end face (224) of the piercing section (222) does not project or only fractionally projects beyond the side of the sheet metal part which is remote from the body of the hollow body element (200) and is present in the region beneath the second broad side (3) of the hollow body element around the ring recess (212) of the hollow body element.

42. Component assembly in accordance with claim 40 or 41,
characterized in that
the second broad side (3) of the hollow body element (200) is at least substantially not pressed into the sheet metal material or is at most only trivi-

ally pressed into the sheet metal material in the region around the ring recess (212) of the hollow body element (200).

43. Progressive tool for the manufacture of hollow body elements (200) such as nut elements for attachment to components normally consisting of sheet metal (280), in particular for the manufacture of hollow body elements having an at least substantially square or rectangular outline (202) by cutting individual elements to length from a section (1) present in the form of a profile bar or a coil after prior piercing of apertures (204) into the section, optionally with subsequent formation of a thread cylinder (206) using a progressive tool with a plurality of working stations (A, B, C, D) wherein in each case two operations are simultaneously carried out for each stroke of the progressive tool in each working station for the section or for a plurality of sections arranged alongside one another,
characterized in that
an upsetting process is carried out in a first working station (A) for the manufacture of a cylindrical projection at the second broad side, a piercing process is carried out in a second working station (B) by means of a cylindrical piercing punch, a flattening process is carried out in a third working station (C) for the manufacture of an undercut of the cylindrical projection and the separation of in each case two hollow body elements from the section or from each section is carried out in a fourth working station (D) by means of the cut-off punch.